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POCUS use in the critical care areas: The use of posterior view for heart assessment

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Abstract

Echocardiography can be quickly deployed for bedside management of critically ill patients, using parasternal, apical, and subxiphoid windows. However, lung air can obstruct these views. As left pleural effusion can cause pulmonary atelectasis, it creates a liquid space that improves ultrasonic transmission when using a postero-lateral approach. This unconventional view uses a phased array transducer positioned at the posterior axillary line between the fourth and fifth intercostal spaces, enabling four-chamber heart visualization. Although limited without pleural effusion, this method becomes valuable in the presence of a left-sided effusion and when conventional views are inadequate.

KEYWORDS
Cardiac, POCUS

Point-of-care ultrasound (POCUS) has gained significant acceptance as a non-invasive modality in the management of critically ill patients at their bedside, enabling the establishment of diagnosis and guiding hemodynamic interventions.[1] There are primarily three conventional echocardiographic windows that allow us to evaluate the heart: parasternal, apical, and subxiphoid. However, obtaining adequate images through these windows is not always possible due to lung interposition, as the presence of air in the lung prevents visualization of the structures beneath the pleura.[2] Nevertheless, in some situations, the left pleural effusion causes pulmonary atelectasis, which results in the anterosuperior displacement of the lung. This displacement forms a liquid-filled space between the heart and the chest wall, facilitating the transmission of the ultrasonic beam.[3] This makes it easier to identify the heart from a postero-lateral approach and allows visualization of the four chambers of the heart for assessment (Figure 1 and Video 1). This unconventional view is obtained using the phased array transducer with a range of 2–4 MHz, using the preset for echocardiography studies with a depth setting of approximately 10 cm. The transducer is placed in the posterior axillary line between the fourth and fifth intercostal spaces, with the transducer index mark pointing dorsally (Figure 2). It is important to note that the size and shape of the phased array transducer offer the benefit of making it easier

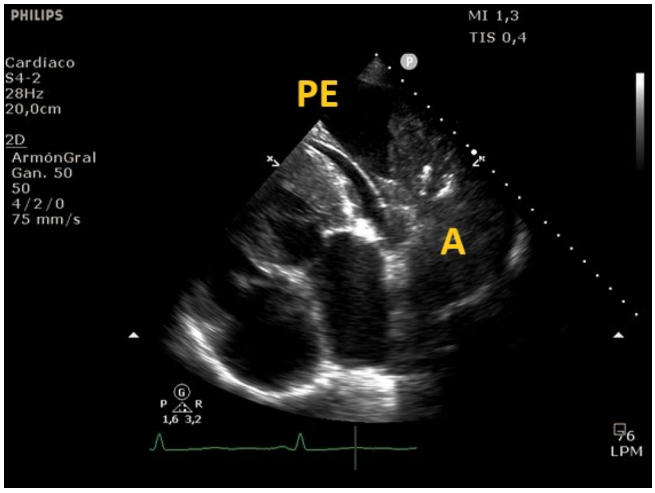

FIGURE 1 Echocardiography from a left postero-lateral approach showing atelectasis (A) and pleural effusion (PE), which serve as an acoustic window allowing visualization of the heart and a mild pericardial effusion.

to visualize structures between ribs. In the majority of situations in the intensive care unit, it is possible to assess it with the patient in a semi-reclined position at a 45-degree angle, without the need for

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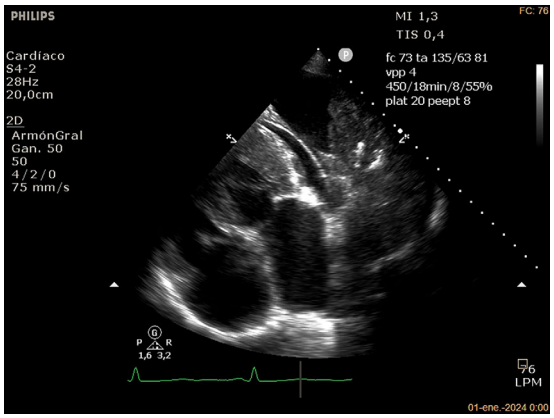

VIDEO 1 B-mode echocardiography from a posterior view showing atelectasis and pleural effusion, enhancing the visualization of the heart and a mild pericardial effusion.
Video content can be viewed at https://onlinelibrary.wiley.com/doi/10.1002/sono.12462

FIGURE 2 Placement of the phased array transducer at the left posterior axillary line to obtain the posterior view.

a special maneuver. It is important to mention that this approach not only allows for the evaluation of the heart but also offers the benefit of simultaneously assessing the characteristics of the left pleural effusion and a rough estimation of its quantity. However, since the focus of this approach is on the assessment of the heart, a more thorough examination would be necessary for a better evaluation of the effusion. For example, evaluating the Posterior and/or Lateral Alveolar Pulmonary Syndrome (PLAPS)-point as described by Lichtenstein in the BLUE-protocol would be recommended.[4] While the benefits of this POCUS approach are quite limited in the absence of pleural effusion, it becomes valuable when there is a left pleural effusion and conventional echocardiographic views are limited.

CONFLICT OF INTEREST STATEMENT

The authors have no relevant financial or non/financial interests to disclose.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

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